The influence of linguistic skills on speech understanding in noise

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The primary objective of this study is to examine the role of linguistic skills in speech understanding. To reach this objective, we will first identify those features of the Dutch language which are affected by congenital hearing impairment.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Hearing disorders
Study type	Observational non invasive

Summary

ID

NL-OMON32625

Source
ToetsingOnline

Brief title
Linguistic skills and speech understanding

Condition

- Hearing disorders

Synonym
hearing impairment

Research involving
Human

Sponsors and support

Primary sponsor: Vrije Universiteit Medisch Centrum
Source(s) of monetary or material Support: Ministerie van OC&W,Cochlear Ltd. ,Industrie/bedrijf

Intervention

Keyword: hearing impairment, linguistic skills, speech understanding

Outcome measures

Primary outcome

- scores of analyses of spontaneous language (spoken and written)

- testscores of a language test (CELF-4NL)

- scores of auditory tests on speech understanding skills

- scores of tests for the perception of visually presented sentence material

Secondary outcome

not applicable

Study description

Background summary

People with hearing impairment suffer from a reduced ability to understand speech in daily life situations, especially in noisy environments. Hearing impairment therefore is known to have a considerable psychosocial impact. A person*s abilities to understand speech in noise depend on auditory, cognitive and linguistic skills (George et al. 2007;Zekveld et al. 2007;Rönnberg et al. 2008). The current study is part of the research program of the ENT/audiology department which aims to enhance the social participation of hearing impaired people despite their hearing loss. The specific contribution of this study is to examine the influence of linguistic skills on speech intelligibility in noise. Congenital hearing loss is a chronic condition. A major risk factor is impaired development of linguistic skills. This will be studied in part one of the present project. The outcomes will have implications for rehabilitation of congenitally hearing impaired listeners. This hearing-impairment-induced reduction of linguistic skills will in its turn reduce the compensatory resources of the hearing impaired to understand speech in everyday noisy surroundings. This is studied in the second part. Outcomes of this part will also have implications for the multidisciplinary rehabilitation program for hearing impaired patients. Especially they may add focus to the rehabilitation program: knowing what part of reduced speech intelligibility scores is due to auditory factors sets the goals for auditory rehabilitation more precisely. The

obtained information will enable us to further unravel the question which factors affect speech recognition.

Study objective

The primary objective of this study is to examine the role of linguistic skills in speech understanding. To reach this objective, we will first identify those features of the Dutch language which are affected by congenital hearing impairment.

Study design

The first part of the project is an explorative study of the effect of congenital hearing loss on linguistic skills. People with a congenital hearing impairment acquire language with inferior auditory input during the critical period for acquiring language (Lenneberg 1967;Singleton and Ryan 2004) and further on. The development of the linguistic system can suffer from this reduced and often distorted input. By performing analyses of spontaneous language of (young) adults with a moderate to severe congenital hearing impairment (MCHI and SCHI) we will identify the features of the Dutch language which are most vulnerable to be affected by hearing impairment. Language samples of normally hearing people (NH) and of adults with presbyacusis (P), i.e. hearing loss with onset after the critical period, will be analysed to compare their linguistic performance with the congenitally hearing impaired. In the second part of the study, we will examine the impact of linguistic skills on speech recognition abilities. As much as is possible, the obtained results from the first part of the study, i.e. the information concerning the aspects of language which were affected by congenital hearing impairment, will be incorporated in the second part. A distortion-sensitivity approach will be used: speech intelligibility will be measured with sentence material in which linguistic information is distorted. Visual and auditory speech recognition tests will be performed. The results of these tests will point out to what extent the performances of the different groups (MCHI, SCHI, NH and P) are affected by linguistic distortion and to what extent these linguistic skills are used in the process of speech understanding in noise. The differences found with the distortion-sensitivity approach are assumed to reflect the underlying differences in linguistic proficiency between subjects.

Study burden and risks

Participants will be invited to attend three test sessions with a mean duration of two hours each. There are no risks connected to participation in this research. The burden for the individual participant is low.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

study group 1: congenital hearing impairment with fletcher index between 41 and 70 dB; age 20-40 years
study group 2: congenital hearing impairment with fletcher index between 71 and 95 dB; age 20-40 years
study group 3: presbyacusis (high-frequency loss with fletcher index between 71 and 95 dB, acquired after the age of 50 years)
reference group: normally hearing (pure-tone thresholds < 15 dB in both ears); age 20-40 years;all subjects: Dutch as native language; minimal educational level VMBO/T

Exclusion criteria

multiple native languages
diagnosed cognitive delay (IQ<80), specific language impairment (SLI) or psychiatric disorder (e.g. ADHD)

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Diagnostic

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	16-03-2010
Enrollment:	118
Type:	Actual

Ethics review

Approved WMO

Date:	25-01-2010
Application type:	First submission
Review commission:	METC Amsterdam UMC

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL30444.029.09